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PACIFIC OCEANIC FISHERY
INVESTIGATIONS

EEL FISHING AND EEL POTS 1/

By Frank E. Firth 2/

The common eel (Anguilla rostrata) is found all along the Atlantic coast in the brackish waters of rivers where they meet the sea, and also in fresh waters far distant from the ocean. The commercial eel fishery of the United States extends from Maine to North Carolina, and the annual catch is more than a million pounds with a value of approximately $100,000 to the fishermen. As the fishery is conducted primarily in or near the mouths of rivers, it is under the jurisdiction of the individual States. Those few States that require the licensing of eel fishermen charge only a small fee.

Gear employed in the taking of eels commercially is, in principle, essentially the same as that used since early times. About the only modern developments to be noted are in the materials used in construction and slight changes in sizes and shapes. The method of fishing eel pots remains about the same as in ancient times.

Eels continue to some extent to be taken with practically all kinds of fishing apparatus of small mesh that have been designed to trap or hold fish. Fyke nets with a series of successively smaller hoops and funnels, ending in a basket-type trap, were widely used in Europe. Various types of weirs with basket traps at the lower end also were popular in some parts of that continent. However, traps or pots, made from such materials as cotton, hemp, coir, split bamboo, rattan, reed, grass, and even freshly cut twigs and saplings are mentioned in practically every historical account of eel-fishing gear.

Eels remain one of our underutilized species primarily because of lack of consumer appreciation of their food qualities. On the European Continent, as well as in England, the people have learned of the fine qualities of this fish and the demand exceeds the supply. In some localities on the Continent smoked dried eels are sold in street stalls like "hot dogs" in our own country.

Eel pots are dependent upon the bait attracting the catch. The pot or trap is a chamber, entrance to which is easy, but the exit from which is made difficult by means of inverted funnels.

1/ Supersedes Mem. S-198, issued by the former Bureau of Fisheries.
2/ Formerly, Technologist, stationed at Boston, Mass.
Illustrated by B. C. Knake, Fishery Engineer.

In comparison with other commercial fisheries, the eel fishery requires a negligible amount of cash invested in equipment. The principal gear employed is the pot (sometimes called a trap), which is almost always homemade. Hook and line gear, as well as spears, are also used to catch eels almost exclusively by casual fishermen and sportsmen. The boat requirements are among the least for any of the commercial fisheries, small dories being satisfactory. However, small gas-powered launches are preferred because they can be used in other fisheries as well. The necessary lines are short and inexpensive, while the buoys or markers are homemade. Aside from the pots, lines, buoys, and boat, the only other equipment needed to engage in this fishery is a "live car," that is, a small floating crate for holding the live eels until enough of them have been caught to ship to market. After the first investment, the chief expenditures of the eel fisherman are for bait and the replacement of lost gear.

The live car is generally a box, 4 feet square and 3 feet deep, with a hinged cover on top, and an anchoring line attached. It is weighted to keep it partly submerged, and the boards are spaced so as to allow free circulation of water and yet retain the eels. Perforated kegs and barrels also are sometimes utilized. Eels are kept alive in the cars for a week or ten days. The cars are generally tied up at the end of a dock but if the waters inshore are contaminated the cars are anchored farther out.

The buoys or markers used on the warp lines of eel pots are homemade. Selected and thoroughly dried cedar or white-pine logs about 6 inches in diameter are popular for buoy construction. Sections 10 or 12 inches long are cut pear-shaped and shorter lengths are smoothed. A post about 10 inches long and 1 inch in diameter is inserted in one end. Buoys are shaped in numerous ways to suit the taste of the individual. They are then thoroughly painted, usually with two or more colors running around the buoy. Specific color combinations identify those of each fisherman. Red, orange, yellow, and white are used to facilitate detection from a distance on the surface of the water. A short leather strap is nailed on the under part of each buoy to which the warp line is attached. Ordinary round or flat corks about 6 or 8 inches across are sometimes used for the lighter types of pots.

One man can operate as many as 300 pots, depending upon the type, although the average number fished is about 150 per man. They are set singly, with a buoy attached to each pot or in trawl fashion, with 10 to 25 pots attached at intervals to one long, buoy line. Pots will last from 3 to 5 years if given good care, but loss from storms and theft may account for as much as 50 percent of the gear annually.

As in any other fishery, eel fishing requires a study of the river or stream selected to be fished, in order to learn its characteristics. It has been found that the best catches are made on a muddy bottom or at the junction of mud and sand at depths of from 5 to 15 feet. Sometimes pots are set in a wooded cove or even among rocks; they should always be kept out of the heavy river traffic. In tidewater, the pots are set with buoy lines at least 1/3 greater in length than the depth fished to allow sufficient stray because of tides and currents.

Warp, trawl, and ganging lines are of hard-fiber ropes, as manila and sisal, principally of six-thread-size cable laid although some nine-thread-size rope is used for trawl rigs in the deeper waters. As buoy lines are submerged in water for long periods, to obtain maximum service they are usually treated with copper oleate, or copper naphthenate, and occasionally coal or pine tar.

Due to the fact that eel pots are homemade, numerous types are in use, each individual fisherman having his own idea as to the most suitable shape and size. Those described here are of types widely used by commercial fishermen.

EEL POTS USED IN THE NORTH ATLANTIC AREA

Two types of eel pots are in use, at present, in the area extending from Maine to Connecticut: both are round, one made of galvanized wire mesh, the other of wooden barrel staves. Although the wooden barrel type is the oldest in service, the round wire-mesh type is now the most popular.

The wire pot or trap shown in figure 1 is a cylinder, 30 inches long and 9 or 11 inches in diameter. Three 3/8-inch stock, metal rings form the framework to which 16 gauge, 1/2-inch, galvanized-wire netting is wrapped and securely fastened. As this netting is available in 30-inch width, a piece 32 1/2 inches long will make one pot with a diameter of 11 inches and allow 2 inches for overlap at the seam. For a 9-inch diameter pot a 32 1/2-inch length is necessary. This wire-mesh cylinder is reinforced with two flat iron bars, each 30 inches long, 1 1/4 inches wide, and 1/4 inch thick. Scrap iron of approximately these dimensions is often used. One of these bars is riveted along the seam and the other fastened to the wire meshes on the opposite side of the cylinder. Ballast is attached to one of these bars as shown in the illustration; ordinary discarded or second-hand window sash-weights are used extensively for this purpose. The bridle of the buoy line, short pieces of 6 or 9 thread lines, is fastened to the ends of the top bar opposite the ballast attachment.

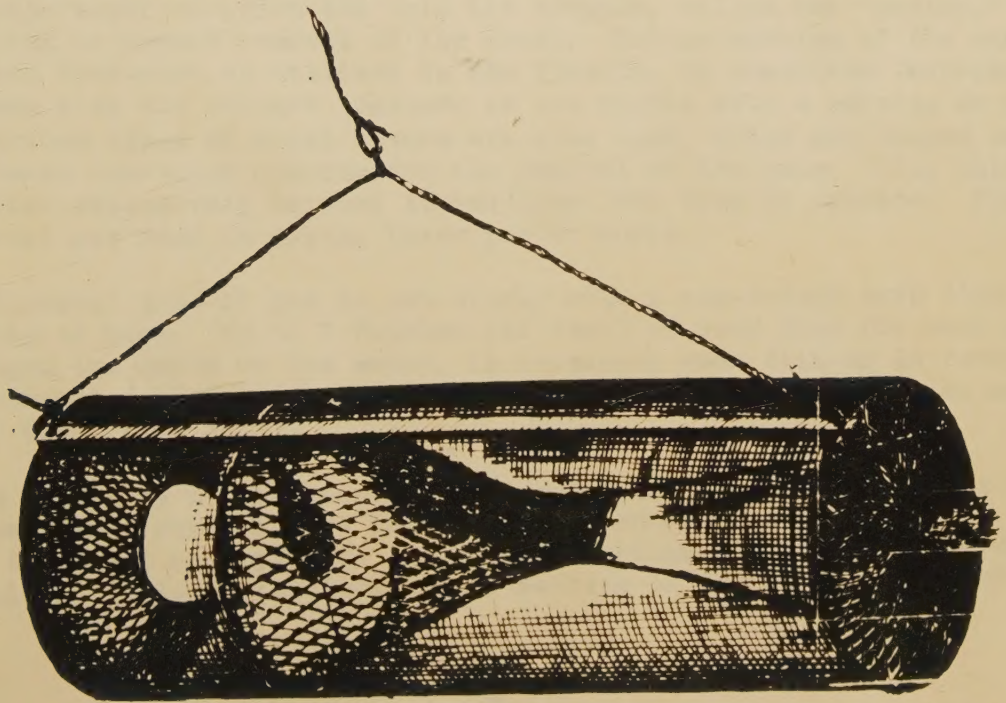

Figure 1.-Cylindrical wire mesh eel pot popular in the North Atlantic area.

The head funnel is formed of cotton webbing with 3/4-inch stretched-measure meshes woven with 12 or 15 thread, medium-laid, seine twine. This webbing is knitted or shaped to form a cone. The small, inner end has a 4-inch opening reinforced by a metal ring. The central funnel is about 3 or 4 times as long as the head funnel and is made of the same material and in the same manner, but the opening at the small end is 2 inches in diameter and has a reinforcement of heavy cord. Often this opening is made a little larger in diameter and is then pulled into an oval shape by its twine supports. Both outer heads and inner funnels are coal tarred, attached to the end and middle-frame rings, and tied in position before the wire-mesh netting is applied to form the cylinder.

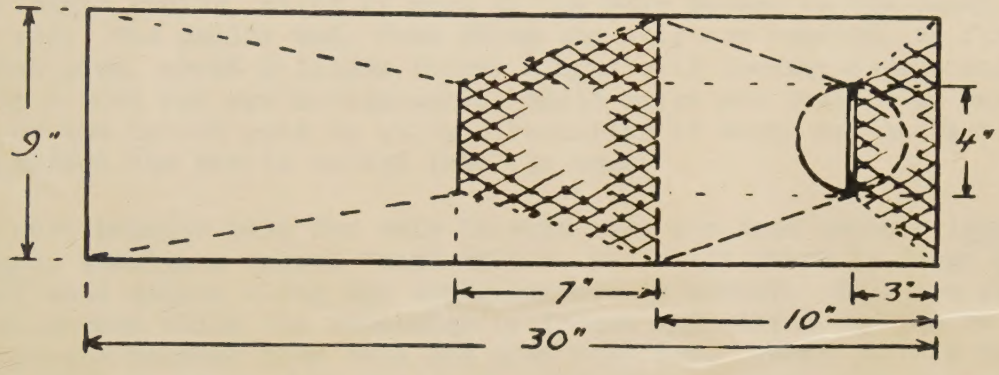

Figure 2.-Details of cylindrical eel pot shown in figure 1, illustrating method of fixing the funnels in position.

The compartment in which the eels are trapped, called the "parlor," has an end opening to permit removal of the catch. Cotton webbing of the same construction and treatment as utilized in the funnels, is sometimes fastened to the end frame ring and brought together in the middle with a pursing or draw string. Various types of metal covers are also used, which are hinged so as to permit at least one-third opening for the removal of the eels. This latter type is used rather extensively because it requires less time to operate. Pieces of scrap metal are used in making these parlor doors.

The all-metal type of pot is set singly with a six-thread warp line and buoy attached to each. Up to 7 fathoms (42 feet) of buoy line for each pot, dependent upon the depth of the water, is necessary when fishing in rivers of average depth where there are strong currents. Some fishermen haul as many as 35 to 50 of these pots daily.

At the beginning of the second season and prior to each succeeding one, after all necessary repairs have been made, the entire pot is dipped in coal tar. This treatment aids greatly in reducing rusting and other corrosive action on the metal and prolongs the life of the webbing in the heads and funnels.

Bait bags of about 4-inch diameter, made from pieces of discarded funnels, or hand knitted especially for this purpose, are suspended in front of the inside funnel. Old bait is replaced with fresh bait daily or as often as the pots are hauled.

The total weight of these wire pots, including ballast and bait, ranges from 30 to 40 pounds, costs of materials vary between $1.50 and $2.50, and from 3 to 5 years service can be expected, barring loss.

A few oak barrel-stave pots, of the same approximate size as the wire-mesh pots, are still in use but they are heavier, harder to handle, and require more frequent attention. They are also subject to more frequent loss in storms because of their weight. This pot has one long entrance funnel extending about half the length inside, which is made in the same manner as the inner funnel in the wire pot. The parlor end, from which the eels are removed, is fitted with a wooden-disc plug, about 2 inches thick, hinged with leather straps and held in place with a hook and eye arrangement. Small holes are drilled at random in all sections of the barrel pots to allow circulation of water and to facilitate draining before the pot is hauled into the boat.

The most popular bait for eels in this area are sand launces (Ammodytes americanus), sometimes called "sand eels." These are taken in large quantities with small haul seines along the sandy beaches in summer. Some are sold to the fresh-fish market while the remainder is frozen and stored for use as bait for eel pots in the seasons when eels are most abundant. These periods occur in the spring from April to June and in the fall from September to November. The little eel-shaped fish, either fresh or frozen, are placed in the bait bags in quantities of one to two pounds per pot each day, or as often as required. Other baits popular in the eel pot fishery are chopped squid, herring, or alewives, and the roe of horseshoe crabs.

Eel pots should be inspected occasionally for holes because marketable eels will escape through openings even less than one inch in diameter. Many market-sized eels are lost through lack of proper attention to the gear.

Pots are usually set in the evening and hauled in the morning, weather and tides permitting. The nocturnal habits of eels account for the best catches being made at night although some are taken during the day on dark muddy bottoms. In rivers where strong currents or tidal action is encountered it is sometimes necessary to set and haul eel pots on the slack tides.

EEL POTS USED IN THE MIDDLE ATLANTIC AREA

The area extending from Connecticut to South Carolina covers the approximate southerly range where eels are found in abundance. The season here is slightly earlier than farther north, running from the middle of March to November first. Although very few eels are taken during the summer months, fishing on a small scale continues throughout the season.

There are four predominant types of pots used in this area, one of which, the cylindrical wire-mesh design, is essentially the same as that used in the North Atlantic area. It usually measures about 18 inches in length and 6 inches in diameter.

Large numbers of "patent", oak-splint pots are used in the New York and Maryland districts. These are factory-made pots manufactured of thin oak splints woven in basket-weave fashion. They are 24 inches long, 8 1/2 inches in diameter at the entrance, tapering to 6 inches in diameter at the parlor end where the door is located. The funnel is also made of the same material, inserted at the mouth and extending inside the pot about two-thirds the length, with an opening 2 inches in diameter at the small end.

These pots are constructed entirely of wood and cost about $1.00 each. They are very light in weight and one man can operate as many as 300 of them. They are usually set in trawl fashion; about 25 pots attached to 10-foot ganging fastened about 10 feet apart on each trawl line. When eel pots are rigged in this manner the warps or trawl lines are either buoyed at each end or anchored on one end and buoyed at the other. When "river pirates" occasionally remove the eels from the traps, fishermen have found it expedient to anchor both ends of the trawl line. By so doing the location of the pots are known only to the fisherman by means of land bearings and the pots are retrieved by grappling.

Bait bags are employed in these wooden pots and the eels are removed by unfastening a wooden plug, 6 inches in diameter and 2 inches thick, set in the small end and hinged with a leather strap. Due to their light construction these pots are vulnerable to sea water damage and they seldom last more than one or two seasons. Loss in storms also accounts for large numbers. A coal tar or creosote treatment is recommended for maximum service.

In the Long Island area and to a lesser extent southward, there are two types of eel pots giving excellent service, both made of wire-mesh, one being semi-circular and the other rectangular in shape. The half-round or semi-circular pots are like the Maine lobster pots except that they are covered with wire-mesh screening instead of laths and are somewhat smaller. These pots, shown in figure 3, average 30 inches long, 12 inches wide at the base, and 10 inches high at the top of the bows.

Figure 3.-Typical semi-cylindrical or half-round eel pot popular in the Middle Atlantic area.

In the construction of these pots, wooden laths 30 inches long, 1 inch wide, and 3/8 inch thick are nailed 1/2 inch apart to 3 cross-pieces or runners 12 inches long, 2 inches wide, and 1 inch thick, placed at each end and in the middle. Three bows 1 inch wide, 1/2 inch thick, and 32 inches long, steamed and bent to a "U" shape, are then nailed to the projecting ends of the runners. Cement is poured over these laths so as to form a coating 1/8 to 1/4 inch thick and fill the interspaces. This forms the ballast and endures for the life of the pot.

The funnels, made of 15-thread, cotton twine 3/4-inch, stretched mesh, coal-tar treated, are then fastened to one end bow and the middle bow (fig. 4) and held in position with twine. The framework is covered with 1/4- or 1/2-inch-mesh, 14-gauge, galvanized wire netting. Another bow, covered with the same size wire netting, is attached to the parlor end runner by hinges and forms the door of the parlor from which the eels are removed. A rope bridle is secured to the pot by means of two small rings fastened to the top center of each end bow.

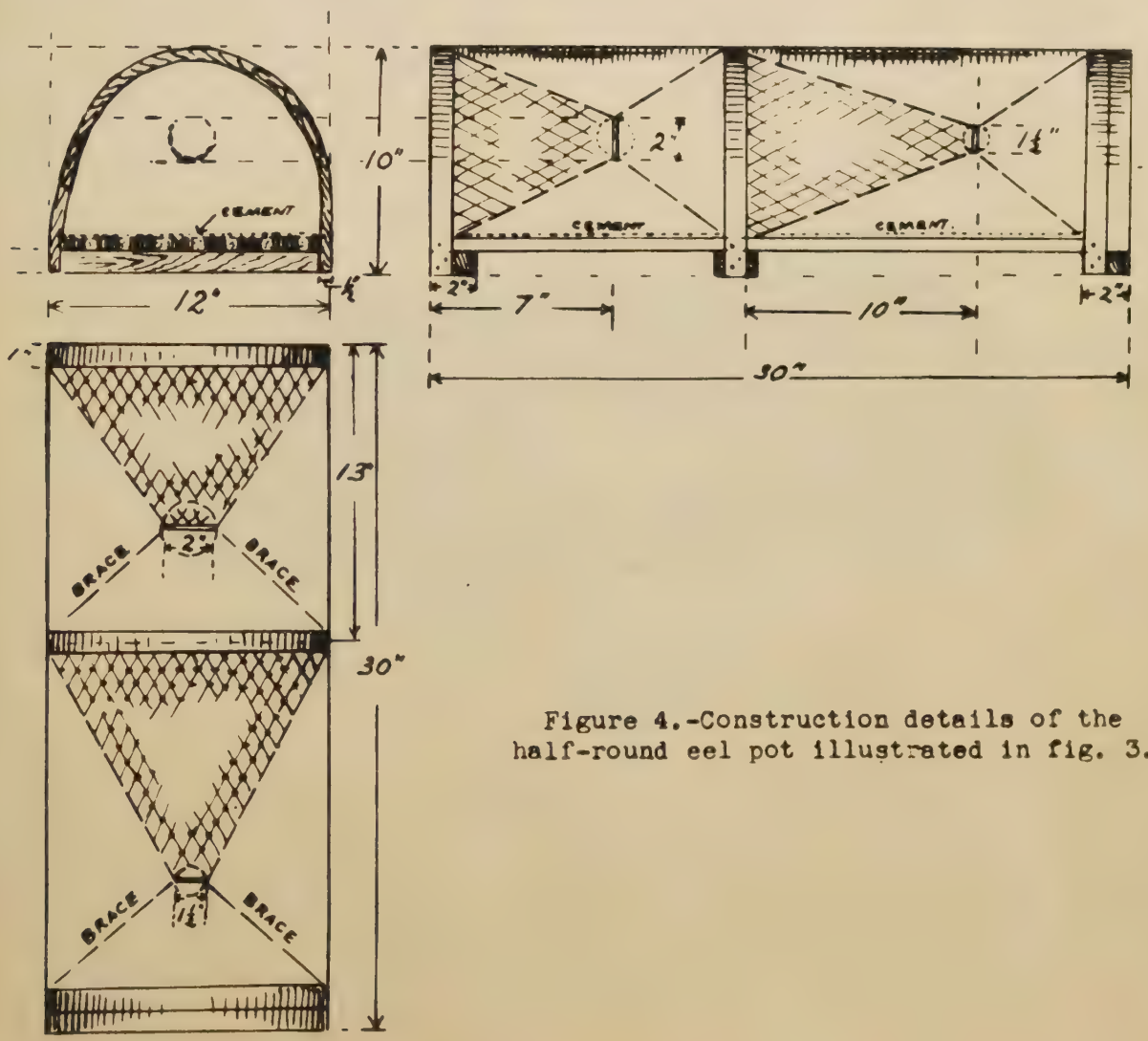

Figure 4.-Construction details of the half-round eel pot illustrated in fig. 3.

Bait bags are not used in these pots, the bait being thrown into the parlor or rear compartment from which it has little chance of being washed out. This baiting method is claimed to have the advantage of attracting as well as holding the eels as their free access to the bait gives them little reason to seek escape.

These pots are set in trawl fashion, about 10 to 20, spaced 10 feet apart, in each string. Many fishermen using this type of pot do not buoy them, but set them at a position fixed according to landmarks from a range and grappling for the line each time they haul. Loss from theft is considerably reduced by this method of setting as the fisherman is the only one who knows the exact location of the pots.

The rectangular type, wire-mesh eel pot (fig. 5) popular because of its simplicity in design and slightly lower original cost is extensively used. These pots are 30 inches long, 12 inches wide, and 8 inches high. Two oak frames 12 inches long and 8 inches high, made of 1-inch stock are made for each end, to which 1/4-inch mesh, 10-gauge galvanized wire netting is securely lashed or stapled. An overlap of about 2 inches is allowed along one edge, laced lengthwise

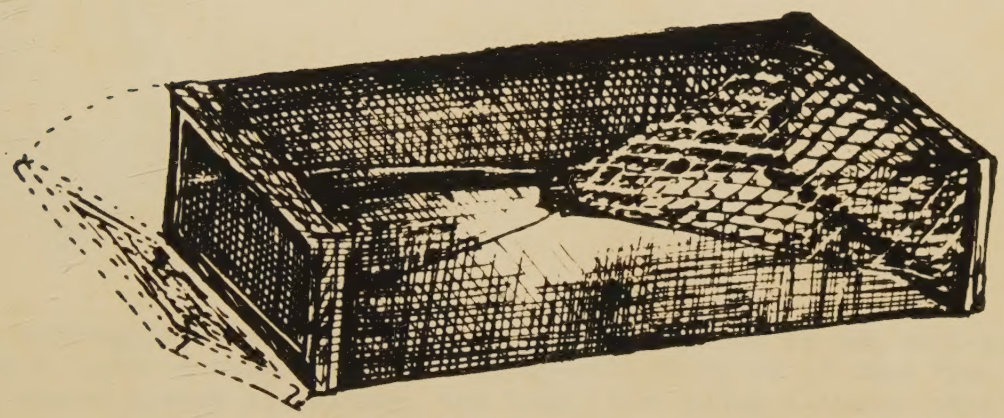

Figure 5.-The rectangular wire-mesh eel pot used in the Middle Atlantic area.

with wire, in order to add rigidity. Only one long funnel is necessary in this type of eel pot, made either with this same wire-mesh netting to form a cone 15 inches long with a round opening 1 1/2 inches in diameter or from cotton netting 3/4-inch stretched measure, 15-thread twine (fig. 6). The door at the parlor end is made of similar wire netting nailed to a wooden frame which is hinged at the bottom edge and kept closed by means of a metal clasp or hook. The buoy line is attached to a lower corner of the pot at the mouth of the trap.

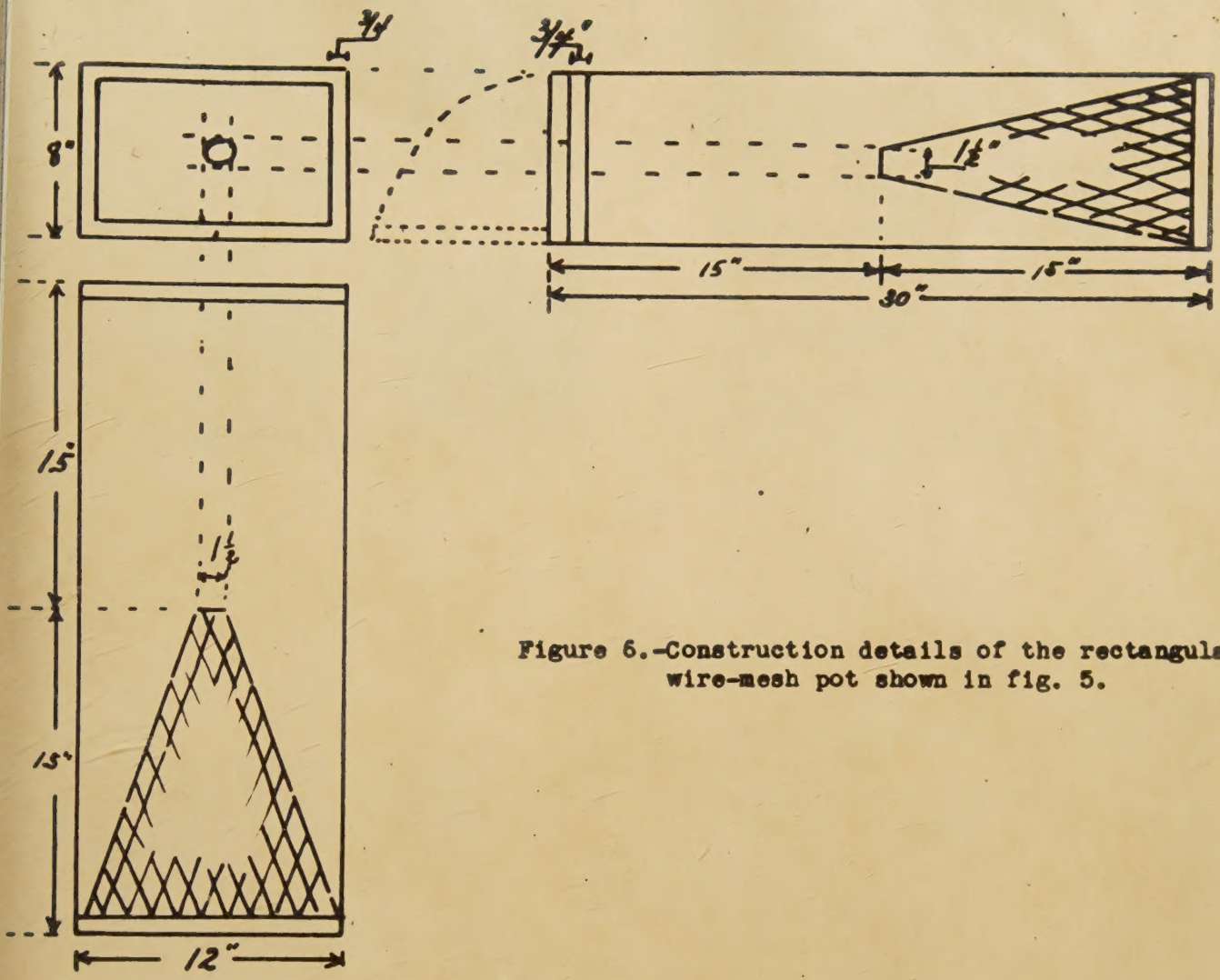

Figure 6.-Construction details of the rectangular wire-mesh pot shown in fig. 5.

The rectangular pots are baited in the same manner as the half-round type. As they are light in weight one man can operate 30 to 35 of them from a dory. They are almost always set singly, the buoy lines being 6-thread size and sufficiently long to allow for stray in strong currents. They are good for 3 to 5 years service and require very little attention.

The most popular bait in the Middle Atlantic region is an even mixture of chopped sea clams and horseshoe-crab roe. Sea clams, menhaden, crabs, shrimp, and squid are also popular baits when available at low prices.

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